

# PATENT SPECIFICATION

663,634



Date of Application and filing Complete Specification: July 22, 1948.

No. 19635/48.

Application made in France on July 23, 1947.

Complete Specification Published: Dec. 27, 1951.

Index at acceptance:—Classes 32, B3c ; and 69(iii), I6b.

## COMPLETE SPECIFICATION

### Improvements in Methods, Devices and Plants for Spraying and Atomising

We, SOCIÉTÉ ANONYME FRANÇAISE POUR LA SÉPARATION, L'ÉMULSION ET LE MÉLANGE (PROCÉDÉS S.E.M.), a French Company, of 19-21, Rue Mathurin-Régnier, Paris, France, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

- 10 This invention relates to processes, devices and installations for the pulverisation and atomisation of diverse substances presented for treatment in solution, mixture, suspension or other form, and has for its objects to  
15 provide such processes, devices and installations of simple and efficient character.

- It is known, in such processes, devices and installations, centrifugally to project the material from a rotating disc-like body on to  
20 a conical surface rotating in the same direction as the disc and further to project such material from the first conical surface to another such surface rotating in the same direction, and so on, all the conical discs  
25 having the same direction of rotation, the final resulting pulverised or atomised material being collected.

- According to the present invention, substances to be pulverised and atomised are  
30 caused to slide in a thin layer by centrifugal action over conical discs turning at relatively high speeds, the substances thrown off from one disc being projected on to another or other discs which are also turning at a high  
35 speed so as finally to be projected in an atomised state, the invention being characterised by the fact that successive discs turn in opposite directions so as to increase to a considerable extent the pulverising and  
40 atomising effects.

- This pulverising and atomising may be speeded up by introducing a gas or air in the form of jets that strike against the material and tend to spread the matter as it actually  
45 leaves the discs, these jets acting preferably, according to the invention, in opposite directions.

The apparatus in accordance with the invention will include to the best advantage one or more rotary assemblies, preferably two 50 rotary assemblies revolving in contrary directions, each of these rotary assemblies being provided with one or more discs, conical in shape, over which flows and spreads the matter to be sprayed. The drawn out 55 material on leaving one of the discs is then thrown on to the following disc constituting a portion of another rotary assembly, while this procedure may be repeated until the final ejection off the last disc. 60

Furthermore, in accordance with the invention, each of these discs may be provided with a set of fins constituting a fan and that will enable jets of gas or air to be directed to the material leaving the discs. 65

Moreover, when the apparatus is intended for the preparation of a mixture of two or more substances that react on each other, it will be provided in addition with parts for bringing separately the substances to be 70 mixed on to two or more consecutive discs.

Other objects and distinguishing features of the present invention will make their appearance in the following disclosure that 75 refers to the attached drawings showing in a quite diagrammatic way and as non restrictive examples, two special embodiments of the present invention. In said drawings:

Fig. 1 is a section of the spraying device 80 itself.

Fig. 2 is a diagram of the assembly of a spraying plant.

Fig. 3 illustrates a modification of the arrangement of Fig. 1 that enables a mixture 85 to be obtained before spraying, which mixture consists of two components capable of giving rise, through chemical reaction or otherwise, to a new substance in the form of a solution, or a precipitate, etc., that is then 90 subjected at once to a spraying with a view to its concentration or drying.

In Fig. 1, the sprayer itself is formed by two rotary assemblies revolving in opposite

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promoting circulation as well as draining devices for drying the gas laden with moisture as it leaves the chamber.

The arrangement that has been disclosed works in the following way :

Progressively, as the material to be treated is atomised in the chamber 22, the gas current, brought in at 27 and 28, dries this material and then flows out through the pipe system 29, while the dried powder flows down at 23 from where it is withdrawn.

The arrangement shown in Fig. 3 allows the performance in a single operation of the mixing of two components that may give rise to a substance in solution or to a precipitate that is dried at once.

This arrangement is similar to that of Fig. 1 but with the following variations :

It is provided at its center with a distributing chamber comprising two compartments 32-33, into which are brought in separately through two concentric ducts 34-35, the two components that are to react on each other. The chamber 32-33 revolves with the rotor 1.

The two compartments 32-33 are provided respectively with openings 36-37 through which are discharged by effect of centrifugal force the two components to be mixed of which the flow has been adjusted beforehand by means of suitable devices that are not shown.

The component that is brought in through the compartment 32 is thrown on to a conical surface 38 carried by the rotary part 1 and it runs as a thin layer along said surface under the effect of centrifugal force.

Furthermore, the component drawn into the compartment 33 flows through the openings 37 on to a conical surface 39 on the rotor 3 along which it flows also under the action of centrifugal force. When it reaches the outer edge 41 of this surface 39, this component is thrown off and converted into a spray over the thin layer of the other component that flows over the surface 38, which brings about at once a close mixture of these two components, giving thus rise through chemical reaction or otherwise, to new substances in solution or suspension that while continuing to flow over the conical surface 38, are thrown off the outer edge of the latter on to another conical surface 15 that is similar to the conical surface of the example given in Fig. 1. From there, the mixture, that is converted through chemical reaction or otherwise, follows the same path as in the case of Fig. 1, that is to say that it is thrown off the edge 17 of the surface 15, on to a surface 13 and then, from there, on to a surface 16 having an edge 18 from which it is sprayed outwards, this spraying or atomising being assisted by the action of the fans 20-21.

It may be realised that, owing to such an arrangement, the body in suspension, in solution or the like that forms as a consequence of the mixing of the two components, is almost at once turned into a spray and dried.

The arrangement is therefore of special interest when it is required to dry at once a precipitate or body in solution without allowing it to stay for too long a time in the mother liquors.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is :—

1. A process for pulverisation and atomisation in which the substances to be pulverised or atomised are caused to slide in a thin layer by centrifugal action over conical discs turning at relatively high speeds, the substances thrown off from one disc being projected on to another or other discs which are also turning at a high speed so as finally to be projected in an atomised state, characterised by the fact that successive discs turn in opposite directions so as to increase to a considerable extent the pulverising and atomising effects.

2. A method as claimed in claim 1 according to which the substances to be atomised are submitted to the action of jets of air or gas impinging on them and dispersing them as they are thrown off one or more of the conical surfaces.

3. Apparatus for pulverising and atomising substances according to the method claimed in any one of the preceding claims comprising a plurality of coaxial conical surfaces carried by two rotary members rotating at high speed in opposed directions, the surfaces on the two members facing one another, the substances to be atomised being adapted to flow centrifugally over the different conical surfaces in succession and to be thrown off the outer edge of one surface on one rotary member to a cooperating surface on the other member and to be ultimately removed from the outer edge of the last conical surface.

4. Apparatus as claimed in claim 3 including means such as fan blades on the outside of at least one conical surface for blowing a gas or air on to the substances thrown off said surface.

5. Apparatus as claimed in claim 3 or 4 including means for feeding the separate components, which will constitute the final mixture, to different rotary surfaces prior to their projection to the same conical surface or surfaces.

6. Apparatus as claimed in any one of the claims 3, 4 and 5, comprising a vessel submitted to the action of a current of gas or air and into which the substances undergoing

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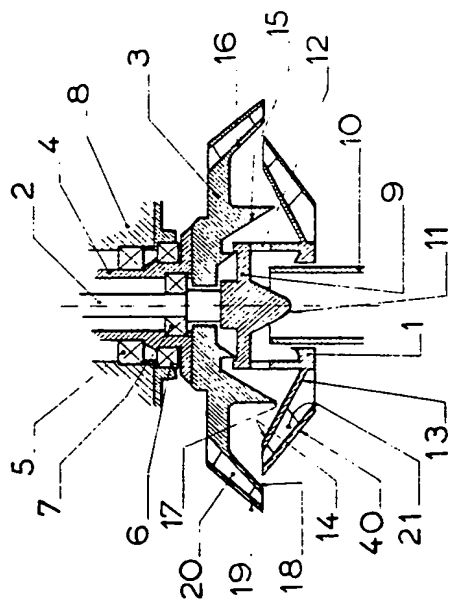


FIG. 1

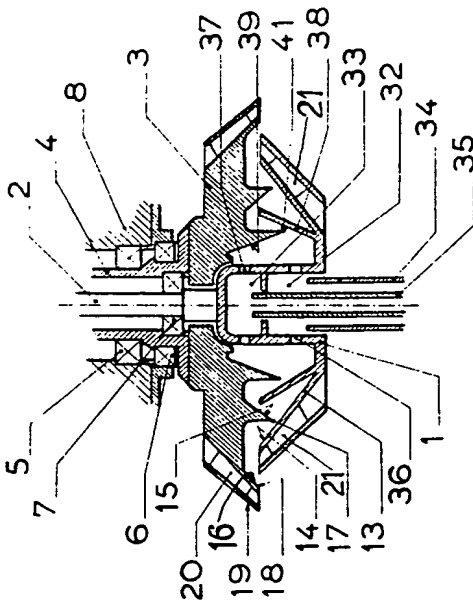


FIG. 3

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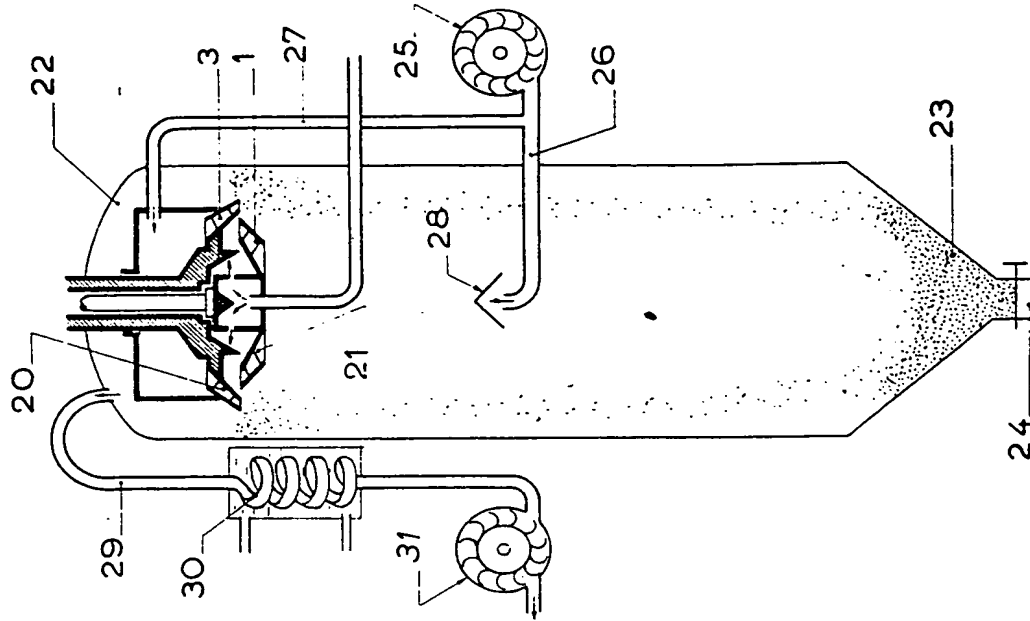


FIG. 2